United Nations TD/B/C.II/25

United Nations Conference on Trade and Development

Distr.: General
14 February 2014

Original: English

Trade and Development Board
Investment, Enterprise and Development Commission
Sixth session
Geneva, 28 April–2 May 2014
Item 5 of the provisional agenda
Technology and innovation for inclusive development

Innovation policy tools for inclusive development

Note by the UNCTAD secretariat

Executive summary

Science, technology and innovation (STI) are major factors in the generation of economic and social change. The design and implementation of inclusive innovation policies can help achieve more equitable, sustainable and inclusive development. Incorporating social goals in STI policies requires consideration of the characteristics of people living in poverty, how they live and what they need in order to improve their livelihoods. To improve the effectiveness of those policies, it is important to deploy well-articulated goals, objectives and strategies on how to promote and carry out inclusive innovation in countries. It is thus necessary that inclusive innovation programmes be designed using an integrated approach that features not only the agents involved in the implementation of such programmes but also their beneficiaries. In this case, the beneficiaries would be people living in poverty and other groups vulnerable to socioeconomic exclusion.

This note describes inclusive innovation policies, highlights the market potential of serving low-income people and discusses some policy considerations that can contribute to making these policies more effective.

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Introduction

1. Science, technology and innovation (STI) are major factors in the generation of economic and social change. Therefore, STI policies can play a role in building inclusive societies in addition to their traditional role of enhancing productivity and business competitiveness. Further, promoting inclusive development is emerging as an objective of innovation policies alongside more traditionally established ones such as improving productivity or strengthening business competitiveness. The design and implementation of STI policies could become an alternative pathway for the promotion of inclusive innovation, which is central to the post-2015 development agenda (Department of Economic and Social Affairs, 2012).

2. The number of people living in extreme poverty halved between 1990 and 2010, and in developing regions the proportion of people living on less than a $1.25 a day fell from 47–22 per cent in this period – thus achieving the target of reducing extreme poverty five years ahead of the deadline set by the Millennium Development Goals. Nevertheless, 1.2 billion people, mainly in developing countries,[1] are still living in extreme poverty. Since social development challenges are largely concentrated in developing regions, improving the understanding of the role of inclusive innovation policies is especially relevant to these countries.

3. At the same time, it is important to recognize that although inclusive innovation policies can bring the benefits of technology and innovation to the poor and the excluded, they do not represent a panacea for the ills of poverty and social exclusion. Investing in technological upgrading in the formal economy, facilitating the transfer of technology to domestic farms and firms, strengthening national innovation capacities and supporting indigenous innovation remain critical avenues through which STI can increase the productivity and raise overall income levels of developing countries.

4. Incorporating social goals in STI policies requires consideration of the characteristics of the poor, how they live and what they need to improve their livelihoods. At the same time, strengthening the linkages between inclusive innovation and the rest of the national innovation system also calls for the creation of appropriate incentives and the development of institutions that stimulate participation of the private sector in creating innovation that meets the needs of people living in poverty.

5. Following this introduction, section I presents definitions of inclusive innovation. Section II describes the market opportunities for the private sector to participate in low-income markets. Section III presents some considerations related to the design of public policies in inclusive innovation. Section IV analyses the significant role of institutions in the design and implementation of inclusive innovation policies. Section V discusses capacity-building strategies for low-income markets. Finally, section VI presents some conclusions.

I. Defining inclusive innovation

6. The concept of inclusive innovation originates in developing countries, where the poverty of many of their inhabitants results in their exclusion, not only from the benefits of scientific and technological advancement, but also from access to the satisfaction of their basic needs (Mohnen and Stare, 2013). Several other terms, such as innovation for the

[1] See http://www.un.org/millenniumgoals/poverty.shtml (accessed 10 February 2014).

bottom of the pyramid, below-the-radar innovation, pro-poor innovation, and frugal and reverse innovation, are also associated with efforts to address the needs of low-income people (George et al., 2012; Berdegué, 2005).[2] Two recent definitions of inclusive innovation are as follows:

(a) The World Bank defines inclusive innovation as any innovation that helps expand affordable access to quality products and services that create and increase livelihood opportunities for excluded populations (World Bank, 2013:8). It identifies five features that characterize inclusive innovation: affordable access; sustainable production; goods and services that help create livelihood opportunities; orientation towards excluded population, primarily those at the base of the pyramid; and significant outreach.

(b) According to Foster and Heeks (2013a), inclusive innovation refers to the inclusion in some aspect of innovation of groups that are currently marginalized. The group most often identified is that with the lowest income, but the focus of concern may also include women, youth, persons with disabilities and ethnic minorities.

7. The notion of inclusive innovation also appears to share some characteristics with the concept of appropriate technology. This concept arose during the 1960s with the recognition that technological progress was largely directed to meet the needs of high-income populations and designed to operate in developed countries. This meant that it was not appropriate for low-income countries (Kaplinsky, 2011).[3] The development and diffusion of appropriate technologies was largely carried out by non-governmental organizations (NGOs) and aid agencies; it was not the result of profit incentives (Kaplinsky, 2011).

8. Although the concept of appropriate technologies was influential in policy debates throughout the 1970s, eventually three problems made it lose visibility on development agendas. The first difficulty was a shortage of innovative entrepreneurship in low-income countries. The second was that the capabilities required for innovation were concentrated in high-income countries. Third, there was a lack of effective demand in low-income countries, in particular by poor consumers. However, the global diffusion of capabilities and the fast growth of economies with large aggregate demand potential among low-income people have renewed interest in the development of innovations to meet the demand of this market (Kaplinsky, 2011). Although the methods have changed, the mission of inclusive innovation does not differ significantly from those identified by the appropriate technology movement (Bhatti and Ventresca, 2012).

9. In terms of type of innovation, the development of inclusive innovation is not necessarily restricted to higher technical specifications. It can also consider improvements in terms of suitability and efficiency in products and services (Bound and Thornton, 2012). Inclusive innovation relies not only on technological innovation but also on workflows, delivery systems and business process innovation to lower costs and increase access (World

[2] Zeschky et al. (2011) define frugal innovations as "good-enough, affordable products that meet the needs of resource-constrained consumers. According to Agarwal and Brem (2012), frugal innovations are generally developed for their home countries and not meant for worldwide distribution. In contrast, reverse innovation develops market-oriented products in emerging economies through globalized innovation teams, which are meant to be sold worldwide from the beginning (Immelt et al., 2009). This means that a distinction between frugal and reverse innovation is important, as reverse innovation is also becoming a vital competence for multinational coroporations (Agarwal and Brem, 2012).

[3] Appropriate technologies for low-income countries were supposed to be labour-intensive, simple to operate and repair, making products for low-income consumers on a small scale, and with minimal impact on the environment (Kaplinsky, 2011).

Bank, 2013). This means that inclusive innovation can be developed from cutting-edge research or it can consider fairly rudimentary or previously existing technologies. This, however, does not limit its potential to produce significant impact.

10. The design and implementation of inclusive innovation instruments recognize development as socioeconomic inclusion rather than mere economic growth (Foster and Heeks, 2013a). Inclusive innovation is focused on facilitating access to essential goods and services and enhancing economic empowerment through knowledge creation, acquisition, adaptation, absorption and deployment efforts targeted directly at the needs of excluded populations, primarily at the bottom of the pyramid (World Bank, 2013:8). The structures and processes required to design and implement innovative technologies for people living in poverty are the core focus of inclusive innovation. In most developing countries, namely India, China, Brazil and South Africa, inclusive innovation is recognized as one of the most important goals of socioeconomic development (Gupta, 2007).

11. A defining characteristic of different approaches aimed at finding appropriate and relevant technologies is the concept of inclusiveness. As mentioned by Foster and Heeks (2013a), inclusive innovation also includes the development, diffusion and outreach of innovations that improve the conditions of less advantaged groups other than the poor. The notion of inclusiveness is important in particular for gender and STI, where policymakers face the critical task of facilitating women's access to technologies that improve their livelihood and opportunities (UNCTAD, 2011). An example of inclusive innovation that considers the development of mobile applications to strengthen the entrepreneurial capacities of rural women in India is currently being carried out by the Government of this country in collaboration with NGOs and private companies (see box 1).

Box 1. Mobile ICT for rural women in India

An initiative aimed at increasing the entrepreneurial capacity of women is carried out by the local government of Gurajat (India) in collaboration with the Cherie Blair Foundation and Vodafone. The project developed a mobile application tailored to the needs of the women belonging to Rural Distribution Network India (RUDI). This network is formed by the Self-Employed Women's Association, commonly known as SEWA.

Although the women of the network already have mobile phones, the project developed a special mobile service that allows them to engage in real-time communication with RUDI management, check supply levels and text orders instantaneously. This mobile application uses a Java interface through which Rudibens (the women who form the network) are able to capture sales orders and place orders for new stock using their simple feature phones. This information is collected and transmitted to a central database using basic text messaging. The back end of the application stores information for RUDI's management, financial and auditing requirements. The mobile application also generates several reports for the Rudibens on their phones to help keep essential information about their individual businesses at their fingertips (Cherie Blair Foundation for Women, 2012).

The benefits of this project should include reduced time and travel costs, as well as efficiency gains in processing time, which translates into higher income and increases the time available for women to devote to other activities, such as developing their businesses and taking care of their families. Women will avoid trips to the warehouse by placing their orders through the mobile service (one trip to place the order and one to pick it up, which in some cases can take up to seven hours). After their orders are placed, they are packed and distributed to the women in the villages (Vodafone, 2012).

This initiative was launched in January 2013 and it is expected to reach 2,000 women entrepreneurs over a three-year period.

Source: UNCTAD, 2014.

12. For inclusive innovation, diffusion and absorption are the most important phases, a point that will be further elaborated in section III of this note (World Bank, 2010; UNCTAD, 2011). As identified by UNCTAD (2011), pro-poor innovation is intrinsically difficult to understand through linear models of innovation, which tend to emphasize the research and development (R&D) aspects of the innovation process. Inclusive innovation is more suited to the consideration of a system of innovation approach in which communities, local entrepreneurs and development stakeholders engage in network relationships without a strong hierarchical process or order (UNCTAD, 2011:11). Along the same lines, Berdegué (2005:9) claims that a pro-poor innovation system could be defined as a multi-stakeholder social learning process that generates and puts to use new knowledge and that expands the capabilities of the poor. This definition places greater emphasis on the process rather than the product (knowledge), while at the same time highlighting the social process of learning, discovery and utilization that is mainly responsible for the effective and sustainable expansion of the opportu ities of the poor.

II. Market opportunities through inclusive innovation

13. There are mainly three ways the private sector can help improve the lives of the poor: by creating jobs and increasing the productivity of the poor, by addressing some of their needs through corporate social responsibility initiatives and by developing affordable products and services tailored to the needs of low-income consumers (World Bank, 2010:344). Inclusive innovation policies are mainly oriented to influencing the third. In this regard, people living in poverty and other groups at risk of social exclusion can participate in inclusive innovation either as innovators or as users of innovations.

14. Generally, the private sector does not focus on developing products and services for them because of the widespread perception that there are no profits to be made in low-income markets (World Bank, 2010:344). When considering the potential market for innovation that the poor represent, it is important to consider two issues. First, often the poor pay much more for basic products and services than the better off. For instance, informal lenders charge high interest rates to poor people.[4] Second, the aggregated purchasing power of the low-income segment may present significant opportunities for market-based approaches to increasing their productivity and incomes and to empowering their entry into the formal economy (Prahalad, 2006; World Bank, 2010). Therefore, innovation can offer private companies an opportunity to establish profitable operations in this segment of the market, bringing lower-cost and better-quality goods to poor consumers and working in collaboration with other players in the innovation process (Prahalad, 2006; World Bank, 2010).

15. The objective of developing products and services for low-income groups is to create capacity for them to increase their income so they can afford to consume more. Building the capacity to consume is based on three principles: affordability, access and availability (Prahalad, 2006).

16. Affordability. This should be achieved without sacrificing quality or efficacy and should be independent of the type of new product or service introduced.

17. Access. The distribution and commercialization strategies of the products and services must consider where the poor live as well as their work patterns. For instance, since bottom-of-the-pyramid consumers cannot travel great distances, stores must be easy

[4] For instance, people in Dharavi, India, pay 600–1,000 per cent interest for credit from local moneylenders, which is significantly higher than bank interest rates (Prahalad, 2006).

to reach. This places great emphasis on intensity of geographical distribution when designing distribution strategies.

18. Availability. In general, low-income consumers base their decision of consumption on cash availability. This means they usually cannot defer buying decisions. Therefore, availability and distribution efficiency are critical factors in serving low-income consumers.

19. Advanced commercial technologies that are common in the developed world are often ill suited to the needs of low-income consumers or may not have demand because of the important budget constraints faced by these consumers. This is because many leading technologies are developed without considering the needs of these groups, based on the belief that they do not have resources allowing them to consume (UNCTAD, 2011).

20. Local firms are not the only ones beginning to service the bottom-of-the-pyramid markets, though it may be argued that they have a better knowledge of the needs of local consumers. Multinational corporations are also establishing themselves in emerging markets and changing their innovation strategies by engaging in frugal and reverse innovation (Agarwal and Brem, 2012). According to Aubert (2005), constraints such as low income and poor infrastructure have been turned into drivers of innovation in low-income contexts. Companies in emerging markets are starting with the needs of some of the world's poorest people and redesigning not just products but entire production processes to meet those needs. Tata Consultancy Services is an example of a multinational corporation innovating to participate in low-income markets (see box 2).

Box 2. Affordable products for low-income consumers in the global South

Starting with the needs of resource-constrained consumers in developing countries, some companies are adapting products to their preferences and pockets. Tata Consultancy Services developed a low-technology water filter that purifies water with rice husks, a common waste product in India. Tata Chemicals, the maker of the device, produced this portable, robust device for an initial cost of $24 dollars and $4 dollars for the replacement filter. In a similar vein, General Electric aimed to address heart disease through its hand-held electrocardiogram (ECG) device. Created in its Bangalore health-care laboratory, the Mac 400 – with only four buttons – is compact enough to fit inside a backpack, and at under $800 dollars (instead of $2,000) can administer ECG tests at one dollar per patient. These devices rely on what is called reverse, frugal, or constraint-based innovation to provide solutions to the two million Indians who die from drinking contaminated water as well as the five million that die of cardiovascular diseases annually.

Source: *The Economist*, 2010.

21. The poor can be a profitable market, especially if multinational companies change their business models. It is important to note, however, that the poor are not a market that allows for the traditional pursuit of high margins (Prahaland and Hart, 2002). On the contrary, profits are driven by volume and capital efficiency. Margins are likely to be low by current norms but unit sales can be extremely high (Prahaland and Hart, 2002). Therefore, firms should incorporate the characteristics of bottom-of-the-pyramid markets when defining their margins structures to capture the benefits produced by developing their innovations.

22. It is relevant to acknowledge a paradox related to the size of the companies and inclusive innovation. Small firms are usually driven by persistent social entrepreneurs and thus have the motivation to create and implement ideas for inclusive innovation. However, these ventures usually lack the resources to implement and scale up the initiatives. In contrast, large multinationals possess the resources but frequently lack the motivation to do so (George et al., 2012:678).

23. Firms need to adapt their strategies in order to participate in low-income markets. In this regard, market creation issues are especially relevant. Here, formal institutions such as courts, stock markets and labour laws interplay with informal ones, such as cultural and social norms, in shaping and sustaining markets (George et al., 2012). As the private sector engages in low-income markets, different types of social organizations interact to create markets, develop appropriate products and services, and deliver value. To achieve business model innovation suitable to serve low-income and excluded people, organizations first must increase their understanding of their markets. Next, firms must identify the economic factors that hinder operations in these markets, including the regulatory and policy environment, and respond by identifying specific strategies to overcome these obstacles (World Economic Forum, 2009).

24. It is important to recognize, however, that firms alone cannot develop markets for bottom-of-the-pyramid consumers. The intervention of multiple players, including local governmental authorities, NGOs, communities and financial institutions, is also necessary. Further, inclusiveness should be considered and incorporated in the design and implementation of STI policies.

III. Factors to be considered in the preparation of inclusive innovation policies

25. This section discusses three factors that may influence the potential effectiveness of inclusive innovation policies and for that reason, should be given careful consideration when designing and implementing inclusive innovation policies: the characteristics of low-income markets, instrument design and the importance of inter-organizational collaboration.

Characteristics of low-income markets

26. In addition to the market failures inherent to any innovation process, such as information and uncertainty of the outcomes of the innovation, there are additional characteristics of the bottom-of-the-pyramid market that result in the large under-production of goods and services based on inclusive innovations. In terms of the design of STI policies for inclusive development, empirical work in this area has identified four factors that need to be effective to facilitate the sustainability of inclusive innovation: factors related to the product, its retailing and support, the microenterprises that provide the demand-side services and the wider context (Foster and Heeks, 2013a). Careful consideration should be given to enabling the survival of the main intermediaries responsible for sales and support, and to facilitating the diffusion and sustainability of low-income markets.

Design of policy instruments

27. Other issues that enter into play when designing inclusive innovation policies are the characteristics of the innovation required, the players involved and their interactions, the type of learning that these undertake and the institutional setting in which they operate (Foster and Heeks, 2013a). The design and implementation of effective inclusive innovation policies require an understanding of the particular failures of the innovation system that have a bearing on the attainment of inclusive goals.

28. The government can also encourage public-funded research and R&D organizations to do more to meet the needs of the poor, for instance bestowing competitive research grants, prizes and public awards on research teams that produce relevant innovations (Utz and Dahlman, 2007). A possible mechanism for orienting STI policy to cover the problems

of the poor is that of aligning public R&D efforts to sectors and areas that allow people-oriented development and delivery. Competitive public sector procurement for the production of specific goods and services for the poor can also contribute to inclusive innovation (Utz and Dahlman, 2007).

29. To increase the relevance and adoption of technology, policy needs to support local innovations at both the level of invention and of transfer of existing technologies that may satisfy the needs of poor communities (UNCTAD, 2011). This reflects the importance of diffusion and outreach in inclusive innovation. Although an innovation can work in low-income markets, diffusion and outreach are key stages in achieving social benefits (Foster and Heeks, 2013b). Mechanisms to scale up, demonstrate and disseminate these innovations to the informal sector can also contribute to make inclusive innovation available (see box 3). It is important to consider that the technology transfer and dissemination mechanisms will need to be adapted to reflect the characteristics of specific pro-poor innovations.

Box 3. The importance of diffusing pro-poor innovations: The case of agricultural innovation systems

Seventy-six per cent of the developing world's poor live in rural areas (World Bank and International Monetary Fund, 2013). This means that inclusive innovation policies are particularly relevant to improving the livelihoods of the rural poor.

Two mechanisms can help enhance the diffusion of inclusive innovations in the agricultural sector: the promotion of networks of extension services and the support of rural entrepreneurs (UNCTAD, 2011). As noted by UNCTAD (2010), it is necessary to further strengthen horizontal linkages, such as the promotion of extension services, in order to deal with the non-technological constraints of agricultural production and innovation. The extension strategy related to inclusive innovation should consider the characteristics of the innovation, its beneficiaries and the need to ensure reaching the poor farmer. A strategy that can address possible exclusion in the provision of extension and advisory services is data segregation of the participation of different categories of farmers in the programmes (subsistence, emerging and small-scale commercial) and ensuring that all groups of farmers are being served according to their characteristics.

Another mechanism that can improve extension services for the rural poor is the promotion of rural producer organizations in northern Cameroon. Empirical evidence collected by Swanson and Rajalahti (2010) identifies the promotion of rural producer organizations focused on the rural poor as a critical policy to improve extension services to help these farmers.[5] The study showed a growing discrepancy in the provision of extension services oriented to small farmers versus large commodity-based producer organizations. Therefore, rural producer organizations aimed at meeting the extension needs of small farmers can help give them a say in issues that affect their livelihoods (Swanson and Rajalahti, 2010). In addition, the more generalized use of information and communications technologies can also be an effective mechanism (UNCTAD, 2011).

[5] Rural producer organizations are key stakeholders in rural development. They offer both the public and private sectors important opportunities such as providing research and extension services to farmers and organizing the purchase of inputs and the commercialization of products on a more cost-effective basis, mobilizing resources for local development and representing the interests and collective voice of farmers in development forums (Wennink and Heemskerk, 2007).

30. Fostering participation in international R&D global networks and private sector participation are mechanisms that may help develop innovation targeting the needs of the poor. For instance, in the case of India, the World Bank recommended incentives for pro-poor early-stage technology development and commercialization by the formal sector. To achieve these, the World Bank suggested the provision of preferential matching grants to public R&D institutes, industry, universities, NGOs and global poverty-alleviation networks (Utz and Dahlman, 2007:4).

31. Another example of a policy instrument oriented towards meeting the needs of poor consumers is the proposal to create the India Inclusive Innovation Fund. This venture capital fund is currently in the process of design and development (India Inclusive Innovation Fund, 2014). It is a step forward in addressing the needs of companies interested in serving low-income markets. It will be oriented to finance such companies with the capital they need to take their ideas to market. Fund-backed enterprises will target core sectors such as education, health care and agriculture, and combine social and commercial returns. The outcome of the Fund's work will be a generation of innovative solutions, directing India's most creative thinking towards solving its most significant challenges.[6]

32. Experiences in inclusive innovation show that creating new services around a product can be a successful alternative to the provision of subsidies (Bound and Thornton, 2012). This is illustrated by the experience of SELCO, which provides solar panels to rural communities in India. This company is making solar power a feasible option for rural people and is a good example of how to create a new service ecosystem around a product. In this case, the conventional policy response to increase access to solar power in rural communities has been to consider it a product, with banks subsidized by the governments to give loans to consumers to buy solar panels. However, this approach was not realistic, considering the budget constraints of rural people in India. In response, SELCO innovated by treating solar power as a service rather than a product. Instead of relying on subsidies, they established a pay-per-use model, whereby entrepreneurs bought the technology and charged customers a small proportion of their daily cash flow to use it –distributing the solar lights every evening and collecting them the next morning. By acting as a guarantor for the creditworthiness of the middleman and reducing the administrative costs for SELCO of dealing with many customers instead of a reduced numbers of entrepreneurs, the model deployed by this company allows the full costs of solar power to be covered over time. In 2012, SELCO brought lighting to 120,000 households in Karnataka, India (Bound and Thornton, 2012).

33. A different aspect of the importance of the design of public policy for inclusive innovation can be observed in the analysis of the Brazilian tourism industry by Hall et al. (2012). The study argues that weak institutions, coupled with negative entrepreneurship, may foster destructive outcomes. This is based on their analysis of tourism in the region of Recife. During the 1980s, this area was identified as a potential tourist region, and it was expected that the promotion of tourism would increase entrepreneurship, including low-income entrepreneurship. However, policymakers failed to understand the implications of the high prevalence of social problems related to illegal activities in the area. Although the public campaign did boost tourism in the region, it was concentrated in undesirable forms of tourism. Currently, public policies concentrate on shifting the attractiveness of the destination towards culture and ecology. Policies acknowledging both economic and social perspectives may foster more productive

[6] See http://www.iii.gov.in/images/stories/reportpeople/Financing_Innovation_ch1.pdf (accessed 11 February 2014).

entrepreneurial outcomes, but at a more constrained economic pace. When social factors are not considered, policies can trigger social exclusion or destructive entrepreneurship.

34. When designing inclusive innovation policy programmes, it is also relevant to consider some of the permanent challenges faced by this type of innovations. There are three main challenges that need to be considered. First, it is necessary to attend to the local specificities of the bottom-of-the-pyramid markets while simultaneously seeking wide-scale diffusion and influence. Second, innovations that are supported must be appropriate to the existing situations that one ultimately seeks to transform. Third, the focus must be kept on inclusive innovation goals. This means working with project-based solutions to social goals that fundamentally require structural change (Smith et al., 2014:6).

Importance of collaboration

35. It is also necessary to consider the importance of collaboration and the participatory engagement of poor communities and other non-traditional stakeholders such as grassroots NGOs when studying low-income markets (Arora and Romijn, 2009:30). In India, for instance, there is a strong tradition of non-profit organizations and a socially conscious private sector that are willing to fill access gaps with radical new approaches (Bound and Thornton, 2012:21). The existence of inter-organizations is, in general, a characteristic found in pro-poor innovations initiatives. Among other benefits of collaboration, its allows to concentrate the use of organizations' complementary assets in the division of labour (Powell and Grodal, 2006). Largely, non-profit organizations have first-hand knowledge of the problems and needs of the bottom-of-the-pyramid consumers. Government and national agencies usually provide institutional support and other capacities in the deployment of inclusive innovation policies, and firms play major roles in the development of technological solutions.

36. Further, it is also important to involve the beneficiaries, in this case, people living in poverty and other groups at risk of social exclusion in the design of the innovations (World Bank, 2013). People who are part of low-income markets are the most apt to identify their needs. Indeed, the needs of disadvantage people are broader than the few needs listed and monitored as part of the Millennium Development Goals and the needs particular to the environmental and social context of low-income consumers (Utz and Dahlman, 2007).

IV. Institutions, regulations and inclusive innovation

37. Governments have an important role to play in fostering an enabling institutional environment for inclusive innovation. Institutions include social norms of behaviour, habits, routines, values and aspirations, as well as laws and regulations that are rooted in a given society's history and culture (World Bank, 2010:336). Institutions and their interactions with the other components of the innovation processes are central to the national system of innovation. This is even more relevant in the promotion of pro-poor innovation because innovation requires cooperation – and this is rooted in institutions that help build trust (World Bank, 2010). Institutions play a key role in inclusive innovation processes: they determine the extent to which the poor can participate in the innovation process and participate in potential benefits (World Bank, 2010).

38. A major implication of this is that strategies to foster pro-poor innovations and policies need to fit the particular conditions of different social settings (World Bank, 2010:336), and the institutional framework may require changes in order for pro-poor innovations to take off. For example, laws and regulations governing intellectual property rights may have an anti-poor bias. Further, it may be difficult to secure poor people's access to assets such as land or credit, social norms may prevent women from assuming certain

roles required for innovation, social stratification may block the formation of the social networks required for innovations and the manipulation of product markets may destroy the economic incentive to innovate (World Bank, 2010:336).

39. Empirical work on the implementation and diffusion of innovations for the bottom-of-the-pyramid market in the mobile sector in Kenya found that inclusive innovation has built upon a reinforcing circle of adaptive innovation, dynamic competition and the presence of innovation intermediaries with poor communities (Foster and Heeks, 2013b). Also relevant for the diffusion of this innovation was the establishment of regulation that enabled the creation of markets and of policy initiatives that supported these brokers of inclusive innovations in several ways. By simultaneously setting the conditions for market entry and regulating some aspects of mobile technologies, policy has ensured the participation of more market players and stronger competition among them (Foster and Heeks, 2013b) (see box 4).

Box 4. Importance of regulation in the implementation of mobile technologies for low-market markets in Kenya

The introduction of mobile technologies to bottom-of-the-pyramid consumers in Kenya began around 2005, first driven by donor agencies and international organizations in collaboration with the Government, and then as part of the corporate social responsibility of firms, for instance, supporting shared phone models in poor communities and developing universal service provisions.

The implementation stage of mobile technologies for low-income consumers was critical in ensuring the outreach of innovation. Foster and Heeks (2013b) found that poor enforcement of laws can jeopardize the implementation of inclusive innovations. In their study, several difficulties were found during the implementation of mobile handsets for the low-income market. For instance, the lack of enforcement of the quality regulations of mobile telephones allowed the entrance of many low-quality products that made some sellers incur losses and forced them to adapt in order to survive in the market. However, through the elimination of the grey-market mobile phones, additional reinforcement of quality requirements might have diminished the outreach and diffusion of this innovation in Kenya. Therefore, strong emphasis needs to be placed on the enforcement of regulations that allow the adaptation of intermediaries and players related to inclusive innovations.

Source: Foster and Heeks, 2013b.

V. Capacity-building through inclusive innovation and entrepreneurship

40. Other factors that should be considered when promoting inclusive innovation are the skills and competencies of the beneficiary populations. There are two main reasons for this. First, the improvement of their innovative and entrepreneurial skills empowers them to generate innovations relevant to their socioeconomic context; second, fostering the capabilities of the people at the bottom of the pyramid enables them to make the most of the innovations available through inclusive STI policies.

41. Poor people's innovative abilities are constrained by, among other things, a lack of skills, inadequate provision of public services and an inability to access markets and assets on fair terms and to handle associated risk. This combination of factors highlights the relevance of basic training for the informal sector as critical for enhancing their innovative skills (Utz and Dahlman, 2007). In the case of the introduction of mobile communications for women entrepreneurs in India presented in box 1, the project not only includes the

deployment of the new technologies but also considers broader business development and financial literacy training.

42. Inclusive innovation programmes must also develop mechanisms that will encourage the poor to co-create and co-innovate inclusive solutions. According to the World Bank (2013), the impact of inclusive innovation will be more sustainable in the long run if developing countries build the capacity to generate their own inclusive innovation solutions in partnership with national, regional and global STI organizations.

43. It is also relevant to consider the level of education of the entrepreneurs when studying capacity development policies for low-income markets. If the policies and initiatives are not adapted to the capacities of the poor and do not target existing skill gaps, such interventions may unintentionally increase social exclusion, eroding the social and political legitimacy of inclusive innovations policies (Hall et al., 2012).

44. The development of entrepreneurial competencies can help strengthen the capabilities of low-income people. This is especially useful when implementing inclusive innovation policies. Improving the understanding among low-income entrepreneurs about how a specific innovation can change the way they earn their livelihood not only enhances their entrepreneurial skills but also facilitates further diffusion of those innovations (Prahalad, 2012).

45. Low-income entrepreneurs in developing countries often require training in basic literary and financial business skills as well as training in the development of entrepreneurial behaviours, including seeking opportunities, persistence and developing self-confidence (UNCTAD, 2011). Start-up capital cannot overcome the lack of entrepreneurial skill capacities and education, and loans to less-skilled entrepreneurs often do not get repaid (Acs and Kallas, 2007). Capacity-building contributes to the efficiency and growth of their enterprises as well as to their personal development. Government policies on low-income entrepreneurship should ensure that this is not only embedded into the formal educational system but also offered through other mechanisms such as informal community, rural and apprentice training programmes. As in other aspects of innovation policies, it is also important that these programmes be integrated into a broader comprehensive approach considering incentives, policies, institutions and infrastructure, which are also critical to facilitate inclusive innovation (Utz and Dahlman, 2007).

VI. Conclusions

46. The concept of inclusive innovation is relatively new, and the traditional mechanisms to promote STI development should be adapted to the characteristics of the poor and of the excluded in order to increase the potential of these initiatives. Inclusive innovation does not necessarily consider highly technological innovation – it also considers low technology; business models, process efficiency and delivery models; and technologies with potential use in developed and developing nations, not only in low-income countries.

47. The aggregated purchasing power of low-income people represents an opportunity for firms to participate in this market segment. However, to serve the poor, firms need to understand the socioeconomic conditions in which low-income people live and work. Thus firms may design products and services that are affordable, accessible and available to this market. Firms also need to acknowledge that profits in this market are driven by volume rather than margin. Therefore, they need to define alternative strategies to harness the benefits of investing in innovation. Although there are potential benefits for firms in innovating to address the needs of low-income populations, firms on their own cannot create the conditions for successful economic activity around such innovations. To meet the demands of low-income people, firms need to work collaboratively with other players in

the innovation system, such as government authorities, NGOs, communities and financial institutions.

48. At the same time, the development of inclusive innovations must overcome not only the market failures inherent to any innovation process, but also the additional characteristics of low-income markets that result in an underproduction of good and services. Therefore, the design of adequate inclusive innovation policies and the strengthening of the institutions and regulations involved in the innovative process are key to the success of these initiatives.

49. Additionally, to ensure that the innovations meet the needs of the poor, special attention should be paid to the information flows between the producers and users of the innovations. In this sense, the involvement of the beneficiaries of inclusive innovation policies and their collaboration with other agents involved in the implementation of these policies play an important role filling the information gaps that exist in relation to low-income markets. The potential success of the initiatives, especially with regard to the diffusion and outreach of the innovations, is highly dependent on the effective collaboration among the players of the low-income innovation system. Sustainable adoption and outreach remains a constant challenge for the wide adoption and commercialization of inclusive innovations.

50. Capacity-building also plays a significant role in the promotion of inclusive innovation. Investment in capacity-building can strengthen the innovative and entrepreneurial skills of people living in poverty. These skills help motivate the poor to participate in the creation of inclusive innovations. Additionally, the development of entrepreneurial competencies in low-income groups can develop further their understanding of inclusive innovations, which is crucial to their diffusion, and ultimately to the achievement of the social inclusiveness goals of these policies.

51. This note has described the concept of inclusive innovation and has discussed a number of linkages and features that need to be considered to make innovation systems more supportive of inclusive innovation. In this sense, knowledge flows and collaboration between the participants, as well as those elements of the innovation system that support its diffusion function, are critical if the potential of inclusive innovation policies is to be achieved. In its policy dialogue, the Investment, Enterprise and Development Commission may wish to identify aspects that need to be further considered in the discussion of national innovation policies in this area. To facilitate this dialogue, the following questions are suggested:

(a) What specific pro-poor innovation policies have been successfully implemented, and what lessons can be drawn from these experiences that can be replicated in other developing countries?

(b) What are the main governance challenges faced by innovation systems in terms of designing and implementing inclusive innovation policies?

(c) Pro-poor innovation has mostly evolved in countries with large low-income populations because of the aggregated purchasing power of the poor in these countries, among other reasons. How could these innovations be implemented in small economies with high rates of poverty but low aggregated demand? What types of incentive would have to be created to ensure the engagement of private sector players in inclusive innovation initiatives in these countries?

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